2. NEW IRELAND, EAST COAST.—ISSUE AND SURVIVAL OF UNIONS.

Village Group.	Number of Unions.	Issue.			Issue per Union.	Issue died during Lactation.				Issue survived Lactation.			Issue Survived Lactation per Union.	First Born Children died during Lactation.			Issue died to Date.				Issue Survived to Date.			Issue Survived to Date per Union.
		Males.	Females.	Total.		Males.	Females.	Total.	Per cent.	Males.	Females.	Total.		Males.	Females.	Per cent.	Males.	Females.	Total.	Per cent.	Males.	Females.	Total.	
Kulangit	24	20	7	27	1.1	1	1	2	7	19	6	25	1.0	..	..	..	4	1	5	18	16	6	22	0.9
Bagail	44	31	26	57	1.2	1	2	3	5	30	24	54	1.2	..	..	8	4	5	9	15	27	21	48	1.0
Mungai	30	21	15	36	1.2	2	1	3	8	19	14	33	1.1	2	1	15	6	7	13	35	15	8	23	0.7
Omo ..	81	63	57	120	1.4	6	14	20	16	57	43	100	1.2	2	6	14	12	21	33	27	51	36	87	1.0
Maiom	32	29	25	54	1.6	1	1	2	3	28	24	52	1.6	..	1	4	6	3	9	10	23	22	45	1.4
Papilang	19	14	11	25	1.3	3	2	5	20	11	9	20	1.0	3	1	26	3	5	8	32	11	6	17	0.8
Bobsi	18	12	18	30	1.6	3	3	6	20	9	15	24	1.3	1	1	20	7	7	14	46	5	11	16	0.8
Kapliman	26	27	23	50	1.9	7	7	14	28	20	16	36	1.3	3	3	30	9	8	17	34	18	15	33	1.2
Kasolok	27	25	21	46	1.7	7	6	13	28	18	15	33	1.2	2	1	16	10	8	18	39	15	13	28	1.0
Putput	23	25	21	46	2.0	2	4	6	13	23	17	40	1.7	2	1	18	6	10	16	34	19	11	30	1.3
Nono	26	30	22	52	2.0	14	4	18	34	16	18	34	1.3	4	1	23	15	9	24	46	15	13	28	1.0
Ngavelus	29	26	28	54	1.8	5	5	10	18	21	23	44	1.5	3	0	17	12	9	21	38	14	19	33	1.1
Lovong-ai	52	85	50	144	2.7	23	11	34	23	62	48	110	2.1	10	2	26	34	17	51	35	51	42	93	1.7
Losuk	34	44	49	93	2.7	11	24	35	37	33	25	58	1.7	4	8	40	21	35	56	60	23	14	37	1.0
Mangai	42	37	39	76	1.8	12	8	20	26	25	31	56	1.3	5	2	24	19	13	32	42	18	26	44	1.0
Livitua	42	70	40	110	2.6	17	8	25	22	53	32	85	2.0	6	1	22	29	15	44	40	41	25	66	1.6
Laowan	36	40	33	73	2.0	11	8	19	26	29	25	54	1.5	5	3	36	19	15	34	46	21	18	39	1.0
Vongararum	41	37	44	81	1.9	11	13	24	29	26	31	57	1.3	7	2	31	16	17	33	40	21	27	48	1.1
Paruai	32	42	47	89	2.7	10	13	23	25	32	34	66	2.0	3	4	24	16	21	37	41	26	26	52	1.6
Lakurafanga	10	25	27	52	5.2	3	3	6	11	22	24	46	2.4	1	2	20	12	8	20	38	13	10	32	1.6
Nonapai	30	47	35	82	2.7	5	..	5	6	42	35	77	2.5	1	1	7	10	14	24	29	37	21	58	1.9
Sali ..	22	24	21	45	2.0	5	6	11	24	19	15	34	1.5	..	4	25	8	9	17	37	16	12	28	1.2
Lamekut	46	46	45	91	1.9	1	3	4	4	45	42	87	1.8	1	2	9	10	14	24	26	36	31	67	1.4
Fongalava	34	35	30	65	1.9	3	7	10	15	32	23	55	1.6	1	1	8	7	12	19	29	28	18	46	1.3
Luburua	23	37	35	72	3.1	6	10	16	22	31	25	56	2.4	3	2	23	10	14	24	33	27	21	48	2.0
Lakuruman	87	130	101	231	2.5	23	26	49	22	97	75	172	1.9	8	6	19	55	41	96	43	65	60	125	1.4
Munuwai	70	85	73	158	2.2	35	24	59	37	50	49	99	1.4	10	3	28	45	30	75	47	40	43	83	1.1
Larai Hina	47	56	55	111	2.3	22	16	38	34	34	20	74	1.5	9	6	40	29	31	60	54	27	24	51	1.0
Lugagun	66	95	82	177	2.6	26	27	53	29	69	55	124	1.8	13	6	33	47	37	84	47	43	45	93	1.4
Maulua	64	104	76	180	2.8	17	8	25	13	87	68	155	2.4	11	2	24	39	19	58	32	65	57	122	1.9
Lauupui	62	90	83	173	2.7	27	12	39	32	63	71	134	2.1	5	2	13	51	32	83	47	39	51	90	1.4
Fisos	63	70	62	141	2.2	5	14	19	13	74	48	122	1.9	1	1	6	26	27	53	37	53	35	88	1.4
Katkaf	37	48	38	86	2.3	2	8	10	11	46	30	76	2.0	1	1	7	14	18	31	36	35	20	55	1.5
Fatulak	95	102	95	197	2.0	4	1	5	3	98	94	192	2.0	..	1	..	18	13	31	38	83	82	165	1.7
Limalana	42	45	48	93	2.2	7	5	12	12	38	43	81	1.9	..	..	..	19	13	32	16	28	31	59	1.4
Tandia	44	50	34	84	1.9	6	2	8	9	44	32	76	1.7	3	2	14	16	4	20	53	34	30	64	1.4

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2. New Ireland, East Coast. Issue and Survival of Unions *continued.*

Village Group.	Number of Unions.	Issue.			Issue per Union.	Issue died during Lactation.				Issue survived Lactation.			Issue Survived Lactation per Union.	First Born Children died during Lactation.			Issue died to Date.				Issue Survived to Date.			Issue Survived to Date per Union.
		Males.	Females.	Total.		Males.	Females.	Total.	Per cent.	Males.	Females.	Total.		Males.	Females.	Per cent.	Males.	Females.	Total.	Per cent.	Males.	Females.	Total.	
Limba	50	51	41	92	1.8	6	8	14	15	45	33	78	1.5	3	2	14	14	12	26	28	37	29	66	1.3
Yendat	23	29	25	54	2.3	7	4	11	20	22	21	43	1.8	3	1	20	10	7	17	29	19	21	40	1.7
Lang-lula	45	50	39	89	1.9	1	3	4	4	49	36	85	1.8	1	2	5	7	7	14	15	43	32	75	1.6
Lassu	2	110	84	194	1.8	9	12	21	11	101	65	166	1.4	1	4	8	26	31	57	29	84	53	137	1.1
Amba	27	34	31	65	2.4	1	3	4	6	33	28	61	2.2				4	12	16	24	30	19	49	1.8
Letatan	37	50	37	87	2.3	6	5	11	17	44	32	76	2.0		1	10	10	12	22	25	50	17	67	1.8
Lemasang	74	65	62	127	1.7	10	8	18	14	55	54	109	1.4			7	19	18	37	29	46	41	90	1.2
Konnet	54	75	77	152	2.8	12	8	20	13	63	69	132	2.4		1	6	23	20	43	28	52	47	99	1.8
Kenoddo	44	30	26	56	1.2	4	4	8	14	26	22	48	1.0			16	16	11	30	53	14	12	26	0.5
Pinginndu	110	72	69	141	1.2	8	5	13	9	64	64	128	1.1	4		8	16	19	35	24	56	50	106	0.9
Tekirot	33	27	17	44	1.3					27	17	44	1.3				5	3	8	18	22	14	36	1.0
Katendan	41	33	35	68	1.6	7	8	15	22	26	27	53	1.2		1	11	10	10	20	29	23	25	48	1.1
Lambuso	72	54	45	99	1.3	10	12	22	22	44	33	77	1.0	6	4	21	12	19	31	32	42	26	68	0.9
Malom	36	76	53	129	3.3	10	8	18	13	66	45	111	2.8	5	3	12	21	13	34	26	55	40	95	2.4
Lisigi	49	36	45	81	1.6	13	8	21	25	23	37	60	1.2	7	4	20	20	15	35	43	16	30	46	0.9
Watkana	96	87	55	142	1.4	18	6	24	16	69	49	118	1.2	12	7	19	38	22	60	42	49	33	82	0.8
Kanagnuagnua	9	23	16	39	4.3	6	5	11	28	17	11	28	3.1	4	0	44	12	8	20	51	11	8	19	2.1
Livinke	36	51	36	87	2.4	14	10	24	27	37	26	63	1.7		2	7	23	21	44	51	27	15	42	1.1
Kandan	24	32	22	54	1.9	6	2	8	14	26	20	46	1.6	1		5	18	7	25	46	14	15	29	1.0
Limbin	85	62	65	127	1.5	11	17	28	22	51	48	99	1.1	5	5	18	16	22	38	29	46	41	89	1.0
Kantebu	35	32	19	51	1.4	10	7	17	33	22	12	34	0.9	4	3	26	16	11	27	52	16	8	24	0.6
Bumbuwe	30	32	19	51	1.3	10	5	15	29	22	14	36	0.9	8	3	37	16	8	24	47	16	11	27	0.6
Lemaris	39	31	31	62	1.5	10	7	17	27	21	24	45	1.1	4	1	23	19	22	41	66	12	9	21	0.5
Kanumbu	50	79	42	121	2.0	34	10	44	36	45	32	77	1.5	6	2	22	42	20	62	51	37	22	59	1.0
Watlanu	44	30	31	61	1.3	8	5	13	21	22	26	48	1.0	6	3	31	11	7	18	29	10	24	43	0.9
Paratgin	42	41	52	93	2.2	20	31	51	54	23	21	44	1.0	10	3	30	28	39	67	70	15	13	28	0.6
Datinot	35	20	34	54	1.6	6	16	22	37	10	18	37	1.4	5	3	32	11	20	31	52	14	14	28	0.8
Silom	25	18	20	38	1.5	3	3	6	15	15	17	32	1.2	1	2	18	6	4	10	26	12	16	28	1.1
Katenda	29	18	27	45	1.5	1	6	7	15	17	21	38	1.3	1	1	11	5	11	16	35	13	16	29	1.0
Rulu	24	26	22	48	2.0	2	5	7	14	24	17	41	1.7		3	18	5	11	16	33	21	11	32	1.3
Lugon	38	40	41	90	2.3	9	7	16	17	40	34	74	1.9	2	4	19	22	9	31	34	27	32	59	1.5
Kanam	28	34	25	59	2.1	2	5	7	12	32	25	57	2.0				17	10	27	45	17	15	32	1.1
Karu	52	46	48	94	1.8	5	15	20	21	41	33	74	1.4	4	6	25	10	21	31	32	36	27	63	1.2
Total District of New Ireland, East Coast	8,073	8,276	2,819	6,095	2.0	623	567	1,190	10	2,653	2,252	4,905	1.6	244	156	18	1,101	1,089	2,236	37	2,085	1,760	3,845	1.3

3. NEW IRELAND, EAST COAST.—FRUITLESS UNIONS, ISSUE AND SURVIVAL OF FRUITFUL UNIONS, STATISTICS OF MASCULINITY.

Village Group.	Fruitless Unions.						Number of Unions with Total Issue of.										Average Issue per Fruitful Union.	Average Survival per Fruitful Union.	Sex Ratio Excess of Males over Females per cent. of Persons.					Females of Reproductive Age.	Old Persons		
	Total Number.	Newly Married.	Husband worth away.	Husband or Wife Dead.	Wife Still Young.	Apparently Sterile.	1.	2.	3	4.	5.	6.	7.	8.	9.	10.			Births.	Infantile Mortality.	Mortality of Issue.	Survival of Issue.	Population: Children under 14	Population: Adults.		Males.	Females.	Total.
Kulangit	8	8	..	..	..	..	8	7	..	..	..	..	..	..	..	..	1.6	1.8	48	..	60	45	21	20	14	1	1	2
Ilegail	20	8	8	..	..	..	11	6	2	1	..	..	..	1	..	..	2.3	2.0	8	33	11	12	5	28	27	6	11	17
Mungal	10	4	..	..	..	..	12	4	2	..	..	..	..	..	..	..	1.3	1.1	16	33	7	20	14	17	11	6	11	17
Omo	25	10	1	..	..	..	13	4	1	1	..	..	..	..	..	..	1.1	1.0	5	40	27	18	18	20	18	12	13	25
Malom	7	1	..	..	..	..	10	4	1	..	..	..	..	..	..	..	1.1	1.0	7	..	33	6	4	23	16	7	9	16
Tapilang	4	..	..	..	..	..	10	2	1	..	..	..	..	..	..	..	1.6	1.5	15	50	25	..	..	23	17	8	9	17
Bolet	2	..	..	..	..	..	2	1	..	..	..	..	..	..	..	..	2.0	1.8	50	..	..	37	50	6	14	6	8	14
Kapilman	2	..	..	..	..	..	2	..	..	..	..	..	..	..	..	..	2.0	1.8	..	..	..	..	..	17	11	6	5	11
Kasolok	4	1	..	..	..	..	3	1	..	..	..	..	..	..	..	..	1.5	1.4	6	..	17	6	17	20	16	11	5	16
Putput	7	4	1	..	..	..	5	2	..	..	..	..	..	..	..	..	1.3	1.2	8	..	20	8	20	20	14	7	7	14
Nono	8	3	..	..	..	..	5	3	..	..	..	..	..	..	..	..	1.4	1.3	18	50	25	20	25	41	27	12	15	27
Ngavelus	16	8	2	..	..	..	10	4	2	..	..	..	..	..	..	..	1.3	1.2	18	55	22	20	22	34	25	14	18	32
Lavong-al	2	1	1	..	..	..	1	1	..	..	..	..	..	..	..	..	2.0	1.8	50	..	..	..	..	18	14	7	7	14
Lesus	4	..	..	..	..	..	2	1	1	..	..	..	..	..	..	..	2.3	2.1	17	33	33	20	7	15	12	7	5	12
Mongai	18	1	1	..	..	..	7	6	2	1	..	..	..	..	..	..	2.3	2.1	8	17	33	20	7	15	12	7	5	12
Livitus	11	1	1	..	..	..	6	3	1	1	..	..	..	..	..	..	2.3	2.1	9	25	16	13	25	24	14	10	12	22
Lacwas	14	4	2	..	..	..	6	4	2	1	..	..	..	..	..	..	2.6	2.4	27	36	21	24	8	26	17	12	14	26
Vongararuin	12	..	..	..	..	..	6	3	2	1	..	..	..	..	..	..	2.7	2.5	9	16	11	7	17	17	11	7	10	17
Farsal	7	1	..	..	1	..	3	2	1	1	..	..	..	..	..	..	2.7	2.5	6	..	..	3	3	8	6	4	5	9
Lakurafanga	4	..	..	..	..	..	2	1	..	1	..	..	..	..	..	..	3.5	3.2	8	13	13	..	9	13	26	13	13	26
Nanapal	4	1	..	..	..	..	2	1	1	..	..	..	..	..	..	..	3.4	3.1	5	..	20	18	30	40	25	15	17	32
Nali	6	1	..	..	..	..	3	2	1	..	..	..	..	..	..	..	3.1	2.8	4	..	16	27	20	17	13	8	14	22
Lamekut	16	2	2	..	4	..	7	4	1	1	1	..	..	..	..	..	2.8	2.5	6	..	5	14	12	25	18	11	9	20
Fongalava	10	5	1	..	..	..	4	2	1	1	..	..	..	..	..	..	2.9	2.6	1	50	16	7	8	16	12	5	7	12
Laburus	2	..	1	..	..	..	1	1	..	..	..	..	..	..	..	..	3.7	3.3	8	40	20	21	8	24	12	6	6	12
Lakurumau	14	3	3	..	3	..	8	2	2	1	1	..	..	..	..	..	3.4	3.0	2	25	16	12	..	24	24	7	17	24
Munuwai	26	6	1	..	3	..	11	3	2	1	1	..	..	..	..	..	3.0	2.7	8	6	14	4	1	20	17	3	7	10
Larai Iline	10	3	..	..	3	..	4	1	1	1	..	..	..	1	..	..	3.6	3.2	7	18	20	3	10	15	15	3	5	8
Lugagun	12	4	..	..	3	..	5	3	1	1	..	..	..	..	..	..	3.6	3.2	..	6	3	5	7	14	10	6	8	14
Madina	11	1	4	..	..	..	5	1	2	1	..	..	..	..	..	..	3.2	2.9	7	1	11	3	3	24	9	4	5	9
Luaupul	10	2	4	..	..	2	4	2	1	1	..	..	..	..	..	..	3.7	3.3	7	1	11	3	3	17	11	5	6	11
Fisoa	20	6	5	1	..	2	5	4	2	1	1	..	..	..	..	..	3.7	3.3	15	36	34	6	4	40	23	17	19	36
Kafkaf	10	4	1	..	3	..	6	2	1	1	..	..	..	..	..	..	3.7	3.3	4	38	22	13	25	41	13	10	16	26
Fatmilak	24	12	..	..	..	..	6	4	2	1	..	..	..	..	..	..	3.2	3.0	12	47	1	20	17	41	16	9	16	25
Limlaua	10	1	4	..	1	..	4	2	1	1	..	..	..	..	..	..	3.0	2.8	11	60	16	27	29	21	5	5	8	13
Tandis	10	3	1	..	..	..	4	1	2	1	..	..	..	..	..	..	3.3	3.0	3	60	18	6	..	23	16	6	9	15
Limba	10	6	1	..	..	..	4	2	1	1	..	..	..	..	..	..	2.9	2.7	3	13	6	4	1	30	16	26	16	42
																	3.4	3.1	3	13	11	5	11	30	10	4	6	10
																	2.6	2.4	10	59	6	6	9	26	11	9	14	23
																	2.6	1.8	10	14	7	12	12	42	8	10	18	28

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3. New Ireland, East Coast.—Fruitless Unions, Issue and Survival of Fruitful Unions, Statistics of Masculinity—*continued.*

Village Group.	Fruitless Unions.						Number of Unions with Total Issue of.										Average Issue per Fruitful Union.	Average Survival per Fruitful Union.	Sex Ratio Excess of Males over Females per cent. of Persons.						Number of Reproductive Age.	Old Persons.		
	Total Number.	Newly Married.	Husband works away.	Husband or Wife Dead.	Wife Still Young.	Apparently Sterile.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.			Births.	Infantile Mortality.	Mortality of Issue.	Survival of Issue.	Children under 15.	Popnlat'n Adults.		Males.	Females.	Total.
Vendat																											
Langinia																											
Lasau																											
Amba																											
Latafan																											
Lemasong																											
Kumara																											
Kumotin																											
Pinginda																											
Tabirot																											
Katendan																											
Lambuso																											
Makom																											
Lasigi																											
Watkana																											
Kanagmugau																											
Livinko																											
Kandan																											
Limbia																											
Kertebu																											
Bumbuwe																											
Lamarie																											
Kanambu																											
Watiamo																											
Panatgin																											
Dabinot																											
Blom																											
Katenda																											
Bubo																											
Logon																											
Kanam																											
Karu																											
Total District of New Ireland, East Coast	836	228	77	208	41	284	690	502	389	217	182	95	52	21	6	4	2.7	1.7	7	8	6	8	7	18	1,779	804	815	1,619

3:Chinnery G, E-5 (1929)1931 OM10 New Ireland OM10

161 conditions and demands the co-operation of the natives themselves will have many obstacles placed in its path, not the least of which will be a disheartening lack of interest on the part of the people whose improvement is sought.

FRUITLESS UNIONS.

163 Out of 3,073 unions investigated by me for the purpose of estimating issue and survival rates 835 or 27 per cent. were fruitless. When one goes into the reasons for fruitlessness, this figure is not so alarming as it at first appears. Of the fruitless unions, 228 or 27 per cent. are newly married, and likely to be productive within the next year or so. In 77 cases, or 9 per cent., the male partner is absent working and on return of the absentees the unions or at any rate a proportion of them may become fruitful. In 205 instances, or 24 per cent., either the male or the female partner is dead. Where the female has survived, a certain proportion may be expected to re-marry and of these some may possibly have issue. In 41 cases, or 5 per cent., the female, though married some time, is not looked upon by the other inhabitants of the village as being sterile; a certain proportion of these unions may also be expected to contribute issue. The balance of the fruitless unions 284, or 34 per cent., is regarded by the people as definitely sterile either through old age or on account of some physical disability.

FRUITFULNESS OF UNIONS.

The total issue is due therefore to 2,238 fruitful unions, which gives an average issue per fruitful union of 2.7, of whom 1.7 per union have survived. In working out the fruitfulness of the unions, I find that 690 have had an issue of 1 child each, 502 have had an issue of 2 children each, 389 have had an issue of 3 children each, 317 have had an issue of 4 children each, 182 have had an issue of 5 children each, 95 have had an issue of 6 children each, 32 have had an issue of 7 children each, 21 have had an issue of 8 children each, 6 have had an issue of 9 children each, and 4 have had an issue of 10 children each. There are considerable fluctuations in the issue and survival rates among the different villages. As a rule, the villages on the lower end of the road have small issues, high infant mortality and low survivals. In these villages I made special investigations, and found conditions of hardship consistent with the poverty in issue and survival. Certain villages in Kavieng itself also have a low survival rate, but here the issue rate is low, and the mortality rate not heavy.

INFANT MORTALITY.

165 According to the census, 19 per cent. of the children (6,096) of the unions (3,073) investigated, died during the period of lactation (2 years). This compares favorably with the figures resulting from an inquiry made by me some time ago in the Duke of York group.

3: Chinnery G, E-5 (1929) 1931 OM10 New Ireland OM10

The record depends entirely on the information given me by mothers who named their children in the order in which they were born, and then described those who died by saying "died while still breast-feeding", or "died after having finished with breast-feeding". Others standing by refreshed the memory of a mother as to names of children and approximate age at death when she appeared uncertain. Relatively few mothers had to be assisted in this way, but in one or two villages the information is not to be relied upon.

On looking down this column one finds that deaths during lactation are more numerous in some villages than in others, e.g., seven villages on the lower road between Kandan and Karu average 33 per cent. of issue dying during lactation. It is in this vicinity that the high central range runs close to the coast, its slopes falling abruptly down to the water's edge where the villages are built usually on coral cliffs. The cold mountain winds and rains sweep through them day and night, producing a climatic condition of sudden changes from heat to cold, which must be exceedingly dangerous for people who live there practically in nakedness. The garden lands are scattered all over the place, mostly on the steep mountain sides, and garden work is probably more strenuous than it is in the districts nearer to Kavieng, especially for pregnant women, or women nursing children that have to be carried about by their mothers when working in their gardens or looking for shell fish in the sea. I saw infants being fed on solid foods, and it was quite a common thing to meet pregnant women or women with babies trudging up and down the mountain sides on their way to and from the gardens, with enormous bags of food, and infants sitting on top of the bags. On discussing with the men the question of women resting while pregnant, I was told that the women insist on doing their share of the work at this period for fear of being shamed by other women, especially the older ones, who laugh at them if they become more careful with pregnancy and talk in a superior way of what women did and endured in olden times. At the same time, my informant pointed out, a husband steps in and relieves his wife as much as possible of heavy work during the period of gestation and lactation. I was also told that men try to keep their wives out of the water during these periods by doing more shell-fishing themselves. This may be so in a few individual cases, but I am inclined to think that most of the women have to bear their burden alone, and, as the conditions of life are rather too strenuous at this end of the road for child-bearing women, the health of both the mother and the child suffers, with disastrous results to the child. This, to my mind, accounts for the low issue rate and heavy infant mortality rate in this group of villages. Being situated where they are, far from any plantation and over 100 miles from the Medical Officer at Kavieng, places them out of reach of the present medical service, which is not able to cope

3:Chinnery G, E-5 (1929)1931 OM10 New Ireland OM10

165 adequately with the problems arising from these conditions. The high infant mortality rate in places as favorably situated as Munúwai, Losuk, Nono, Laraibina, Lugagun, &c., however, is difficult to explain. Between Munuwai and Kavieng, the conditions of life for child-bearing women and for infants are not so difficult as those in villages [853] lower down the road. In all the villages above-named, infants are commonly fed on taro and other solid foods. Mission influence however is very strongly established in this part of the district, and, as the villages are within reach of the medical authorities at Kavieng, conditions should improve as time goes on.

OLD PEOPLE.

162 145 It is amazing to find on this road such a large number of extremely old people. Nowhere else in the Territory have I noticed so many. The males numbered 604 and the females 815. Practically all of [302] them were grey-haired or bald, and in the lower end of the road many of the bald men wore neat wigs of human hair. Some of them are survivors of the old black-birding days, having worked on the cane-fields in Queensland. It is doubtful if many of these old people will survive another two years, a possibility that might be remembered when the death rates for the next few years are being tabulated.

WOMEN OF REPRODUCTIVE AGE.

162 Out of the women enumerated, I counted 1,779 who were definitely said by the elders to be the fertile women on whom the future population depended, until females at present under age of puberty could become married. The number of reproductive women is probably larger, but I could only estimate this figure, and in this was assisted by the old men.

ABORTION.

847 842 The tables disclose a large number of fruitless unions, 34 per cent. of which are due apparently to sterility. Some of my informants told me that the women chew the leaves of plants and drink infusions from leaves, roots, &c., both to prevent conception and to procure abortion. It is not easy for a male observer to disentangle the mass of information offered on this subject, but, as Dr. (Miss) Powdermaker is now making an intensive study in the area with especial reference to women, valuable data may shortly be forthcoming. It is said there are also mechanical methods of procuring abortion. A peculiar aspect of the information regarding sterility is that women chew certain leaves when newly married, and become sterile, but, when later on they desire to have children, another species of plant is eaten to restore fertility. This could not be closely investigated, but my information has been passed on to Dr. Powdermaker, who may be successful in securing reliable information on the point.

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of white civilization. Gonorrhoea is considered the cause of a large percentage of sterility, and when not causing complete sterility frequently limits the family to one or two offspring. There is a difference of opinion on the effect of syphilis on the pregnant woman and her offspring, but there appears to be evidence that syphilis tends to reduce the number of pregnancies. In a study made on syphilitic and non-syphilitic families, the number of pregnancies in syphilitic families was 2.58 compared with 3.8, 4.4 and 5.5 in non-syphilitic families.[14] The evidence for the presence of these diseases among this people, and their further connection with the vital statistics will be discussed in the latter part of this paper. Here it is only necessary to indicate a possible relationship between them and the birth and sterility rates.

Death Data

Having learned that the birth rate has not increased, i.e., that it is either stable or declining, it is of interest to note the death rate for the same people. The following table presents the number and percentage of those born in each of the three generations who died before marriage. The time of death is indicated by the physiological periods described in the introduction.

TABLE 4

Death Rates Based on Number of Births

GENERATION	BORN DEAD		DIED DURING LACTATION PERIOD		DIED DURING CHILDHOOD		DIED DURING YOUTH		DIED AS YOUNG MAN OR WOMAN		TIME OF DEATH UNCERTAIN		TOTAL DYING BEFORE MARRIAGE	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
I	1	.2	13	3.	25	5.7	11	2.5	17	3.9	19	4.3	86	19.5
II	1	.5	11	5.4	12	5.9	3	1.5	1	.5	2	.1	30	14.9
III	3	1.8	24	14.9	6	3.6	2	1.2	4	2.4	1	.6	40	24.3
IV	1	.5	29	16.3	..	...	..	...	..	...	..	...	..	...
Totals	6	.6	77	7.9	43	5.4	16	2.	22	2.7	22	2.7	156	19.5

There has been an increase in the mortality over the three generations. Among the offspring of generation *I*, 19.5 per cent of those born died before reaching the age of marriage, while 24.3 per cent of the children of group number *III* have already died before marriage. This

[14] Solomon, H. C. & M. H.—Syphilis of the Innocent, *Washington*, 1922, p. 128.

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165 percentage will probably be still higher in a few years, as all the children of these women have not yet had time to reach the marriageable age. There is a decrease of 4.6 in the per cent of all deaths occurring before marriage for the offspring of group number *II* as compared to the offspring of number *I*. Of this decrease 4.4 per cent occurs in the two periods of youth and young manhood, or in the interval between the end of childhood and time of marriage. If Table 7, giving the sex ratios for these periods, is consulted it will be seen that there is a much smaller percentage of masculinity during this interval (i. e. from the end of childhood to the time of marriage) for the offspring of number *I* than for the offspring of either of the other two generations. This means that a larger per cent of males among the offspring of number *I* died during this period than among the offspring of number *II*. It is probable that a large number of these male deaths among the children of number *I* were due to warfare, which was abolished by the mandated government about the time the children of number *II* were growing up. One can therefore assume that the decrease in mortality rate for the offspring of number *II* as compared to the preceding generation is due to the abolishment of warfare. On the other hand the same absence of warfare is operative as an influence on the mortality rate for the children of number *III*, and yet there is an increase of almost 10 per cent in the death rate before marriage for the children of this group over the preceding generation.

Before discussing in more detail the death data, it is necessary to give the following table, which shows the percentage of total deaths before marriage, occurring during the different physiological periods. This brings out more clearly than the preceding table the distribution of deaths from birth to time of marriage.

TABLE 5

Percentage Distribution of Total Deaths Before Marriage

GENERATION	BORN DEAD	DEATHS DURING LACTATION	DEATHS DURING CHILDHOOD	DEATHS DURING YOUTH	DEATHS DURING YOUNG MANHOOD AND WOMANHOOD	TIME OF DEATH UNCERTAIN
I	1.1	15.1	29.	12.8	19.7	22.
II	3.3	36.6	40.	10.	3.3	6.6
III	7.5	60.	15.5	0.5	10.0	2.5
Totals from generations I and II	1.7	20.6	31.9	12.	15.5	18.1

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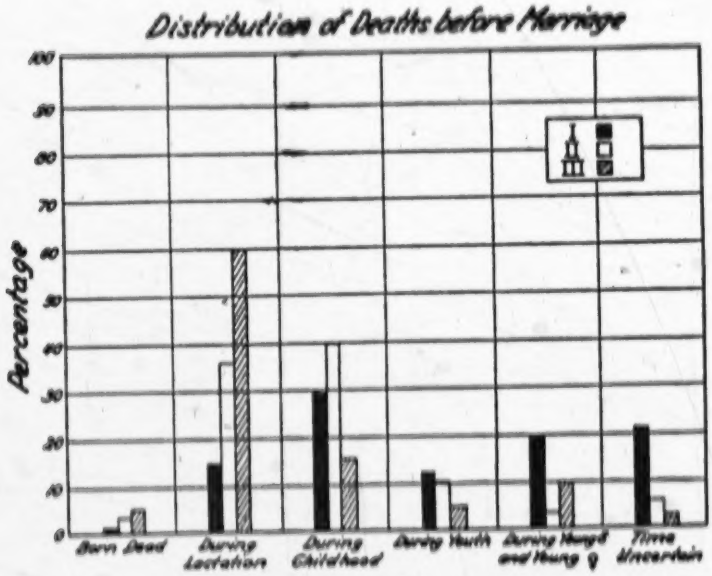

CHART II

There is a marked increase in the per cent of total deaths occurring during lactation. It must be noted, however, that the time of 22 per cent of the deaths occurring before marriage among the children of generation number *I* was not known to the informants. Assuming that the whole 22 per cent occurred during the period of lactation, which is possible, there is still an increase of 23 per cent of the total deaths which occurred during lactation for the offspring of group *III*, as compared with the offspring of group number *I*. For reasons already indicated, it is possible that there may be an error in the mortality rate as well as in the issue rate for generation number *I*. It will be wiser, therefore, to compare the mortality rates during lactation for the offspring of generations *II* and *III*, which are considered more accurate because the principals are all living and because the statistics concerning them compare so closely to the recent government census.[18] There is an increase of 24 per cent in the deaths occurring before marriage which take place during lactation for the offspring of group number *III* as compared to the offspring of group number *II*. This increase be-

[18] Chinnery, E. W. P.—Anthropological Report, No. 6, Mandated Territory of New Guinea, (in press) gives an infant mortality rate of 19 per cent as compared

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comes 20 per cent, if in both cases the per cent for which the period of death is unknown is supposed to have occurred during lactation. Comparing any of the three generations, it is clear that there has been an increase in mortality during the lactation period.

Table 6, which follows, presents the percentage of deaths of offspring arranged according to their order of birth. The percentage is

TABLE 6

Percentage Ratio of Deaths in Infancy and Childhood to Births by Birth Order

	1ST BORN	2ND BORN	3RD BORN	4TH BORN	AFTER 4TH BORN
Totals for all four generations	20.9	17.1	11.9	8.2	3.

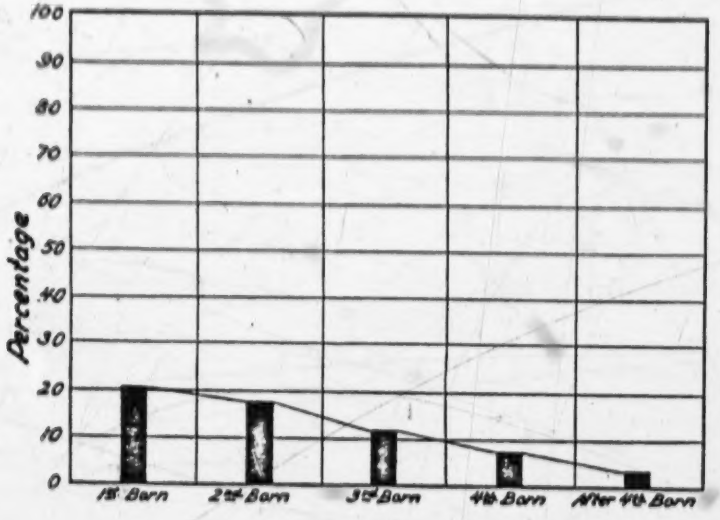

CHART III

PERCENTAGE OF DEATHS ARRANGED ACCORDING TO THEIR ORDER OF BIRTH
The percentage is based on the total number of deaths from birth to end of childhood.

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to 16.4 per cent for the children of generation number III and to 17.5 per cent for the children of generation number IV of this study.

In the United States the mortality rate for the period from birth to the age of three years is 14.9 per cent. Computed from United States Life Tables, Dept. of Commerce, Bureau of the Census (based on the mortality rates for both sexes in the Original Registration States for 1910).

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based on the total number of deaths occurring from birth to the end of childhood for all four generations. These percentages are based on incomplete numbers, as this kind of recording was done only during the latter part of the writer's expedition, and therefore for a limited number of genealogies. But they are sufficient to show the general trend. 165

This table shows that the infant mortality is higher for the first and second born than for those born later. Vital statistics for other peoples show this same tendency.

Considering the death data, it is quite obvious that there has been a decrease in the number of people surviving until the age of reproduction, because more of them are dying during the period of lactation. Since there has been no increase in the number of births, there must be a decline in the population. It is difficult to ascertain the cause for this increase in infant mortality when there are no records of the causes of death. Once again, it is probable that the cause of death might be traced to the introduction of white man's diseases. This will be discussed more fully in the Summary, but here it is important to note that tuberculosis [164] is one of the introduced diseases which might account for the heavy increase in infant mortality. It is generally agreed that if the mother is tuberculous the chance for the infant living is very much lessened.[16] Also, a large percentage of mortality from tuberculosis occurs with young children.[17]

Syphilis, another introduced disease, tends to increase the deaths due to accidents of pregnancy, such as abortions, miscarriages and stillbirths.[18] It must be remembered that premature births, or abortions,

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[16] Woodbury, R. M.—Causal Factors in Infant Mortality, U. S. Dept. of Labor, Children's Bureau, Pub. No. 142, p. 35.

[17] Bushnell, G. E.—A Study in the Epidemiology of Tuberculosis, *New York*, 1920, p. 163.

[18] Solomon, H. C. & M. H.—Syphilis of the Innocent, *Washington*, 1928, p. 128. cf. Jean, P. C.—Syphilis and its Relation to Infant Mortality, *Am. Jour. of Syph.*, Vol. III, No. 1, 1919, p. 122. "In a syphilitic family 30 per cent of the pregnancies terminate in death at or before term, a waste three times greater than is found in non-syphilitic families."

Cf. also Williams, J. W.—The Significance of Syphilis in Prenatal Care and in the Causation of Foetal Death, *Bull. of the J. H. H.*, Vol. XXXI, No. 351, May, 1920, pp. 142-145. In a study made on the causes of 302 foetal deaths, 89.3 per cent of the deaths are attributable to 7 groups of causes, of which syphilis is the most important as it accounts for 34.44 per cent of the total number.

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would be given to the writer as ordinary births and deaths. The pregnant woman loses count of the number of months she is pregnant and there was therefore no way of distinguishing between abortions and ordinary deaths occurring at birth. The percentage of those born dead thus includes abortions. It is interesting to observe that there was an increase in the percentage of those born dead over three generations. But on the other hand, this might also be due to a more accurate recording for the present than for the past, and since the numbers are small these percentages would be easily upset by a greater degree of accuracy for the recording for generations *II* and *III*, than for *I*. The presence of syphilis would not only account for an increase in foetal deaths, but it might also be a cause of infant mortality. In one study it was found that "Thirty per cent of all the living births in a syphilitic family die in infancy, as compared to a normal rate of 15 per cent in the same class." [19] Again, if the infant himself has syphilis he has just half the expectation of life of a non-syphilitic infant.[20]

Other theories accounting for the decline of native populations, and a fuller discussion of the subject of introduced diseases will be given in the Summary.

Sex Ratios

The connection of sex ratios with a declining population is also of interest. Pitt-Rivers has drawn attention to the significance of sex ratios by his theory that an increasing masculinity occurs when a people is dying out or declining.[21] He points out that it is more important to know the sex ratios for those surviving at the time of reproduction than the sex ratios at birth. The following table gives both.

Table 7 gives the sex ratios at birth, at the end of childhood, and at the time of marriage. The percentage is based on the total number—both sexes—at each one of these periods. Eight offspring were not counted because their sex was not known to the ethnologist.

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[19] Jean, P. C.—Syphilis and Its Relation to Infant Mortality, *Am. Jour. of Syph.*, Vol. III, 1919, p. 122.

[20] *Ibid.*, p. 120.

[21] Pitt-Rivers, G. H. L. F.—The Clash of Culture, *London*, 1927, Supplement on Sex Ratios, *passim*.

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the statistics in this paper are based is a small unit in this declining people.

By the use of the genealogical method in a study of 455 women, it was possible to compare one generation or age group with another. It was found that there has been an increase in deaths before marriage during the last three generations, and that this increase has taken place during infancy. Since the birth rate is small and not increasing, it is evident that these people must be declining in population.

To discover why more deaths are occurring in infancy is not easy. The causes of death are not known to the natives and there is no government station near enough for any autopsies to be made. All one can do in addition to presenting the factual material is to point out the nonexistence of certain causes and to posit, very tentatively, any possible ones. Such factors as feeding and the care of the infant may be ruled out. The infant receives the same care and the same food today that he did three generations ago. The fact that an infant only a few days old is given baked taro to eat happened also several generations ago. Also, there has been no change in the habits of work, or the manner of living in general, for the pregnant woman and for the mother while she is nursing her infant. At birth, there was in the past and still is today, a dependence on the skill of a few native women. The report of a conference called by the Commissioner for Native Affairs and attended by the Director of Public Health and by the representatives of Mission Stations in the Territory, seems to the writer to be quite erroneous in regard to the causes for an increase in infant mortality. The conference was of the opinion "that the high rate of infant mortality is due to:

(*a*) The too early marriage of many women.
(*b*) Undernourishment and improper feeding of infants.
(*c*) Undernourishment of people generally, due to an ill-balanced diet, and in some cases to food shortage.
(*d*) A lack of cleanliness on the part of those handling and feeding infants.
(*e*) Epidemics, e. g., whooping cough.
(*f*) Infanticide." [27]

It has already been shown that for the people on whom this study is made, the conditions indicated by a, b, c, d are exactly the same now as

[27] Report to the Council of the League of Nations on the Administration of the Territory of New Guinea, from July 1st, 1926 to the 30th of June, 1927, *Canberra*, p. 115.

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they were in the past, and that while they may be a cause for a high rate of infant mortality they cannot be considered as a cause for an increase in the rate. Epidemics might reasonably be a factor, and there was an influenza epidemic in 1918 and a famine in 1914, due to drought, in New Ireland. There is no record of how many deaths, or the ages of those dying from either influenza or the famine, so that they can only be considered in a general way. The last cause mentioned by the conference, namely infanticide, does not exist now and did not in the past, as far as one was able to observe, among the people on whom this study is based.

Psychological causes for a decline in native populations have been suggested by W. H. R. Rivers and G. H. L. Pitt-Rivers. The former, in his discussion of the conditions which have affected increasing death rates and decreasing birth rates, mentioned the following: the introduction of diseases, of alcohol and opium, of firearms, of European garments, of modified housing, and finally, modifications and interferences with native customs.[28] Dr. Rivers emphasized the last point particularly and believed that the destruction of native institutions deprived the natives of their interest in life. Continuing his discussion of the increasing death rates, he said, "The special point I wish to make in my contribution to this book is that interest in life is a primary factor in the welfare of a people. The new diseases and poisons, the innovations in clothing, housing and feeding, are only the immediate causes of mortality. It is the loss of interest in life underlying these more obvious causes which give them their potency for evil and allows them to work such ravages upon life and health." [29] When he considered the decline in birth rates he again emphasized the significance of mental factors, and thought that the same loss of interest in life might be of importance in

[28] Rivers, W. H. R., Essay, "The Psychological Factor," in *Essays on the Depopulation of Melanesia*, edited by the same author, Cambridge, 1922, pp. 89-95. Alcohol, opium and firearms are not used by the natives of this study. The men now wear loin cloths when formerly they were naked, and have acquired a consciousness of their bodies which they lacked in the past. The women wear loin cloths also, instead of the straw aprons formerly worn, and they are supposed to wear blouses. The blouse comes off when they are working, and frequently at other times too. Dr. Rivers' point that the natives keep their bodies clean, but not their acquired clothing, applies to these people. The houses have not been modified by European influence. The other two factors, the introduction of diseases and the modification of native customs, are discussed in the text.

[29] *Ibid.*, p. 96.